increased. Staghorn sculpin rear in shallow areas with mesohaline and polyhaline salinities, moving to higher salinities with age. In 1997, distribution was centered in San Pablo and Suisun bays in the spring, with a gradual movement downstream through the summer.

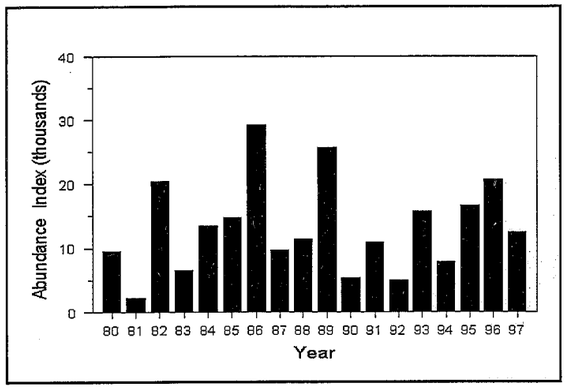


Figure 8. Annual Abundance of Age-0 Yellowfin Goby, gMay-October Otter Trawl

In 1997, abundance of California halibut continued to decline (Figure 10). Several strong year classes in the early 1990s resulted in the 1993-1994 abundance peak. Due to sporadic local recruitment and their use of very shallow (<2 m) water, we rarely collect age-0 California halibut in the otter trawl. In November and December 1997, 7 age-0 California halibut were collected, suggesting local recruitment and increased abundance for 1998 and beyond.

After 3 years of low indices, abundance of age-0 English sole increased in 1997 (Figure 11). Although abundance indices have been somewhat cyclic, factors controlling recruitment of English sole to the bay are not well understood. Distribution of age-0 English sole is usually centered in San Pablo Bay; in 1997, they were widely distributed from South through San Pablo bays until late summer.

Abundance of speckled sanddab increased in 1997, continuing the trend of relatively high indices since 1993 (Figure 12). In recent years, speckled sanddab has been the most abundant species of flatfish in the Bay. In 1997, it was also widely distributed from South to San Pablo bays through late summer.

Although the abundance index of age-0 starry flounder increased slightly in 1997 (Figure 13a), there is strong evidence that the starry flounder population in the bay has declined substantially since the 1960s and 1970s. The 1997 index of age-1 starry flounder (the 1996 year class) also increased slightly (Figure 13b). In 1997, age-0 fish were distributed from San Pablo Bay to freshwater in the lower Sacramento and San Joaquin rivers while age-1 fish were concentrated in San Pablo and Suisun bays. Starry flounder rear in the Bay for 3 to 4 years, inhabiting shallow (<6 m) water and moving to higher salinities with age.

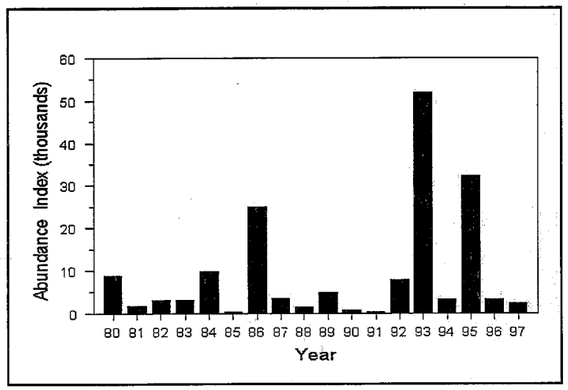


Figure 9. Annual Abundance of Age-0 Staghorn Sculpin, February-September Otter Trawl

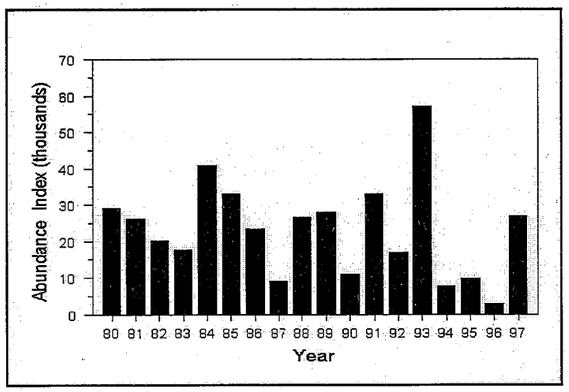


Figure11. Annual Abundance of Age-0 English Sole, February-October Otter Trawl

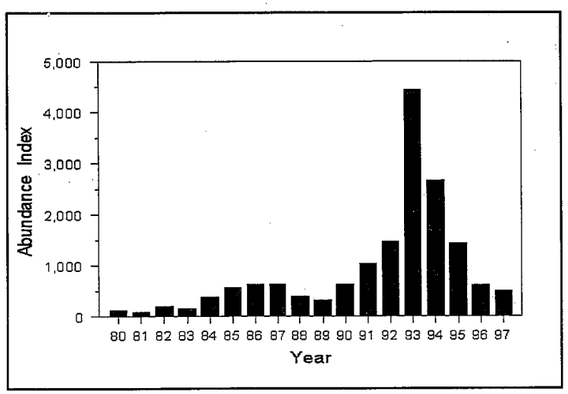


Figure 10. Annual Abundance of California Halibut (all sizes), February-October Otter Trawl

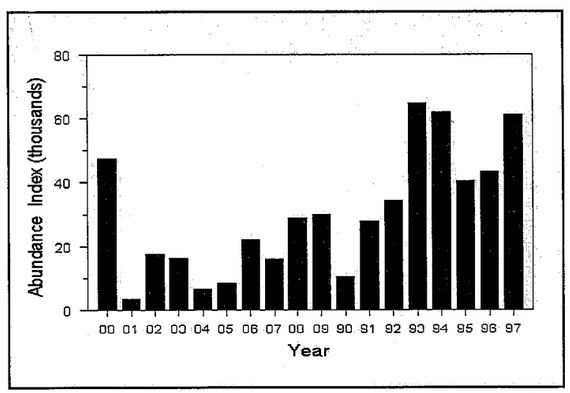


Figure 12. Annual Abundance of Speckled Sandab (all sizes) February-OctobeR Otter Trawl

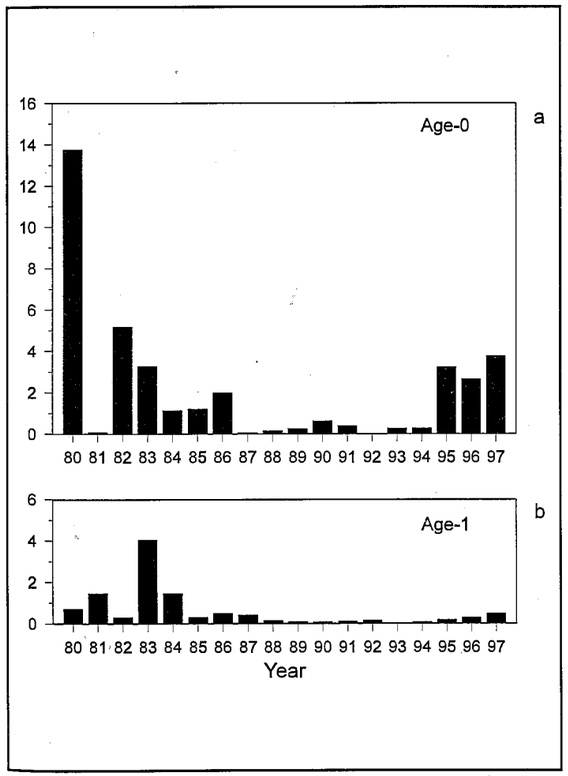


Figure 13. Annual Abundance of Starry Flounder, Otter Trawl:
a. Age-0, May-October
b. Age-1, February-October

Chinook Salmon

Randall Brown, Erin Chappell, and Sheila Greene, DWR

Figures 1 through 11 contain plots of information related to 1997 chinook salmon catch and escapement. These data were obtained from:

- Pacific Fishery Management Council (February 1998). Review of 1997 Ocean Salmon Fishery.
- California Department of Fish and Game (December 1997). Status of Activities to Restore Spring-run Chinook Salmon - A special report to the California Fish and Game Commission.

Although the graphics are largely self-expanatory, the following comments may be helpful:

Figure 1. At more than one million fish, the 1997 ocean catch plus escapement was the third highest during the period of record.

Figure 2. Ocean landings, commercial plus recreational, were also the third highest for the period of record.

Figure 3. High ocean catches in 1997 were achieved even though the harvest index was significantly lower than had been during most of the past 10 years or so. The low harvest index was due to restrictions on the fishery to protect winter chinook, Klamath River fall chinook and Snake River fall chinook.

At about 400,000 estimated adult spawners, the Sacramento River fall-run ecapement (hatchery plus natural spawners) was the highest for the period of record. Note that:

- ➢the estimate does not include an inland recreational harvest estimated at 25%;
- ➢the regulatory Sacramento River fall chinook escapement goal is from 122,000 to 180,000 hatchery and natural spawners combined;
- ➢the hatchery totals are those salmon actually taken into the hatchery, not salmon of hatchery origin that spawned naturally in the streams.

Figure 9. The estimates for upper Sacramento River spring chinook include spawners in Deer, Mill and Butte creeks. For comparison, the 1994 run at least replaced itself on Butte and Deer creeks but not on Mill Creek - i.e.:

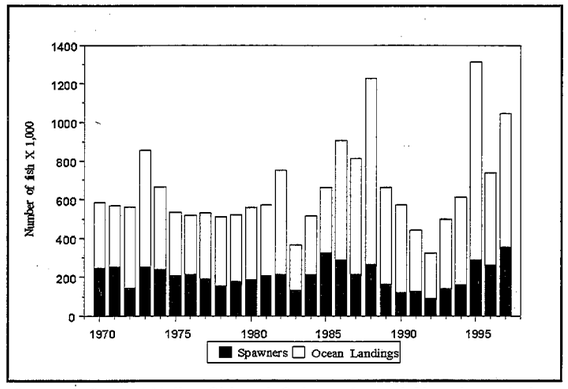


Figure 1. Central Valley Chinook Salmon Annual Abundance Index, 1970-1997

Spawning Estimates

	1994	1997
Butte Creek	474	635
Deer Creek	485	466
Mill Creek	723	200

Note that Mill Creek escapement may not be directly comparable between years because 1994 estimates were from counts at Clough Dam and 1997 estimates were extrapolated from redd counts.

Figure 11. The estimated 1997 winter run escapement was about 900, with about 500 adults and 400 jacks. For comparison, the 1994 parent stock was less than 200.

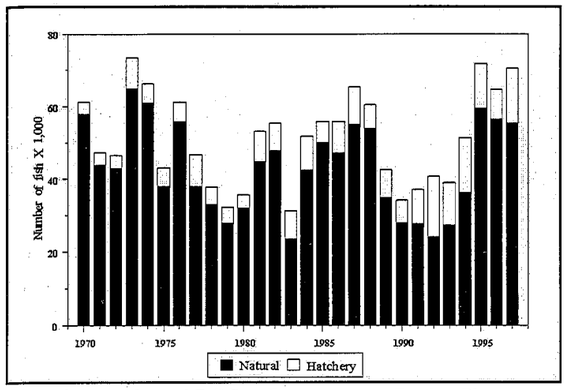


Figure 6. Annual Fall Run Escapement to Feather River, Natural and Hatchery Contribution

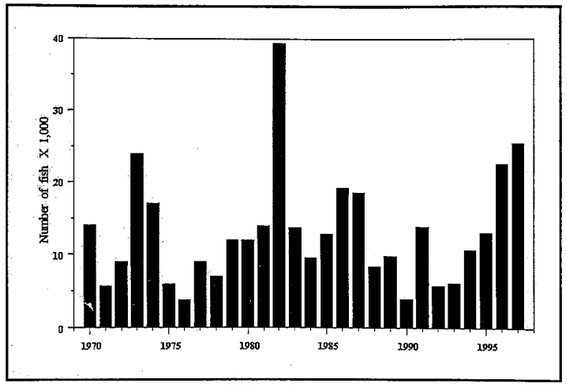


Figure 7. Annual Fall-Run Escapement to Yuba River

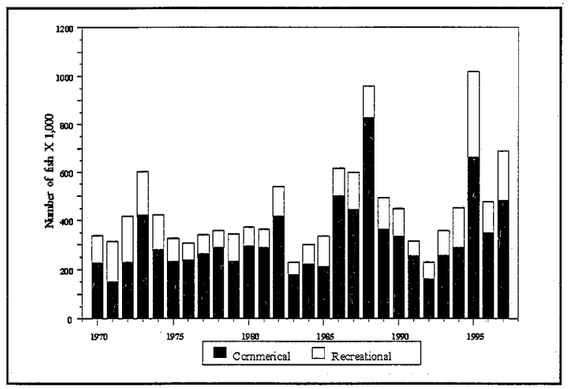


Figure 2. Annual California Commercial and Recreational Chinook Ocean Catch

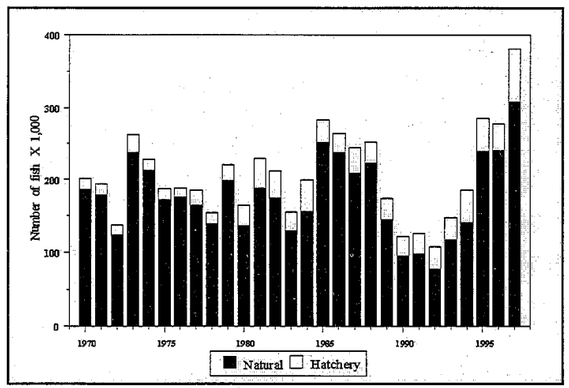
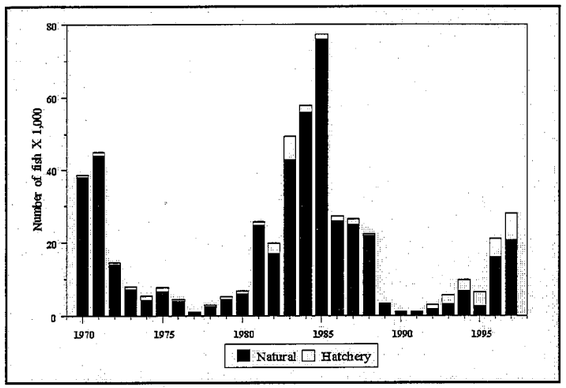


Figure 4. Annual Fall Run Escapement to Sacramento River and Major Tributaries



Figigusre 8. Annual Fall-Run Escapement to the San Joaquin River System, Natural and Hatchery Contribution

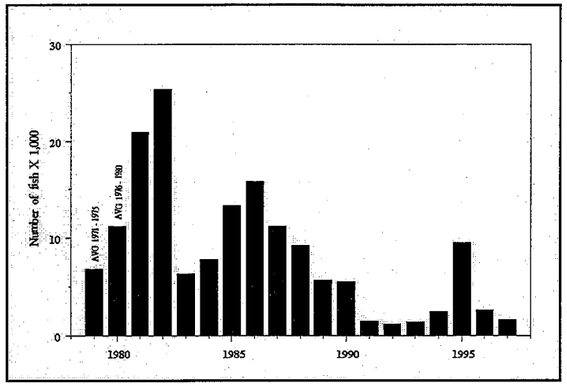


Figure 9. Annual Spring-Run Escapement to the Upper Sacramento River

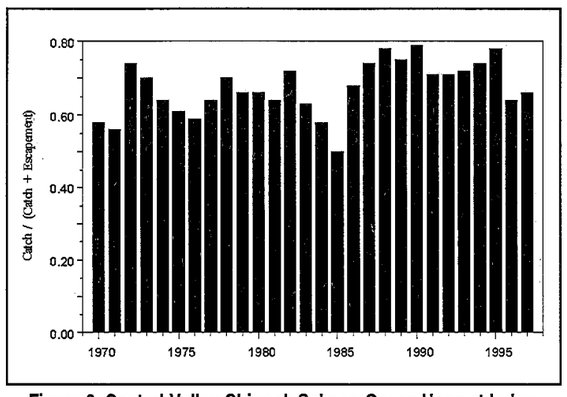


Figure 3. Central Valley Chinook Salmon Ocean Harvest Index, 1970-1997

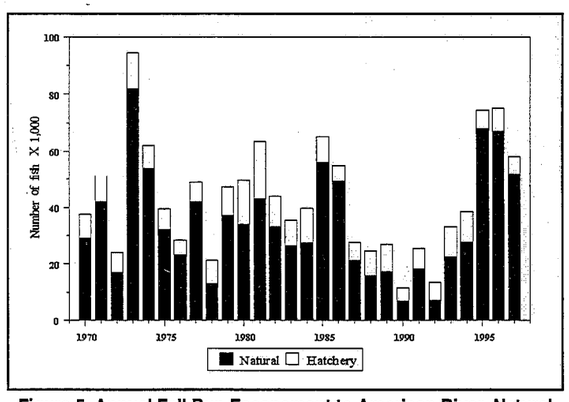
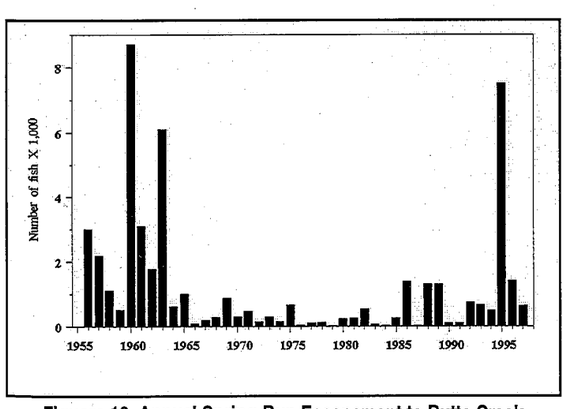


Figure 5. Annual Fall Run Escapement to American River, Natural and Hatchery Contribution



Figigusre 10. Annual Spring-Run Escapement to Butte Creek

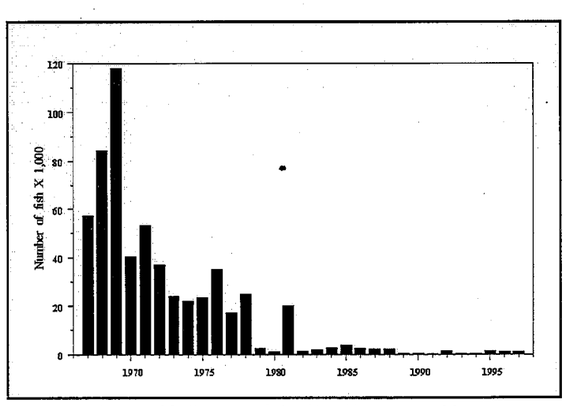


Figure 11. Annual Winter-Run Escapement to Upper Sacramento River